Before the
Federal Communications Commission

Washington, D.C. 20554

In the Matter of	)	
	)	
Petition of USTelecom	)	WC Docket No. 18-141
	)	
For Forbearance Pursuant to 47 U.S.C. §160(c) to Accelerate Investment in Broadband and Next-Generation Networks	)	
	)	
	)	
	)	

OPENING COMMENTS OF

RAW BANDWIDTH TELECOM, INC.

AND

RAW BANDWIDTH COMMUNICATIONS, INC.

ON THE

Petition of USTelecom for Forbearance

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August 6, 2018

Introduction

I am the founder and president of Raw Bandwidth Telecom, Inc. ("RBT"), and its parent company, Raw Bandwidth Communications, Inc., ("RBC") a small CLEC and Internet access provider respectively which operates in the San Francisco Bay Area. I will frequently refer to either or both entities as "Raw Bandwidth" when the entity I'm referring to is either apparent from context or not critical for understanding to distinguish. RBT primarily provides broadband access services to its parent company RBC to use in the provision of retail Internet access service to both residential and business customers within our service area, but also provides some broadband private line circuits built from UNEs to another carrier and private line service directly to end-user customers. I write in opposition to the USTelecom Forbearance petition (the "Petition") and urge the Commission to deny it in full.

These comments respond to:

Category 1: Incumbent LEC-specific unbundling and resale mandates in section 251(c)(3) and (4) and associated obligations under sections 251 and 252

Category 2: Section 272(e)(l)'s RBOC-specific time interval requirements for nondiscriminatory treatment of affiliates and non-affiliates regarding requests for service, and the long-distance separate affiliate requirement for independent incumbent LECs set out in section 64.1903 of the Commission's rules.

I founded Raw Bandwidth Communications[1] in late 1996 and began providing Internet access to RBC's first dialup customers in April of 1997. I had been developing and selling a networking software application for about three years after graduating college with a Bachelor's in Computer Science, and was spurred to start an Internet access provider due to emerging offerings from CLECs at the time, particularly the ability to obtain phone numbers that provided local-call coverage to a wide geographic area but operate a dialup modem bank efficiently from one location. In 1998, I attended a talk by Covad and soon began purchasing their wholesale business DSL transmission products to service customers. In 1999, I also began purchasing wholesale DSL

[1] Originally "Tsoft Internet" at start, prior to incorporating.

transmission from NorthPoint and Pacific Bell (now AT&T')[2]. I stopped using Covad's wholesale DSL in 2000 due primarily to their refusal to open their residential-oriented products to their smaller wholesale customers, and the use of NorthPoint's services ended due to NorthPoint's bankruptcy and cessation of its operations in early 2001. RBC continues using AT&T's legacy wholesale DSL offering even to this day, but due to it being a stagnant offering and a steadily declining customer count, we are close to retiring its use.

In 2005, the FCC issued its Broadband Order (FCC 05-150, "Broadband Order"), and decreed that ILECs no longer were required to separate out layer 2 DSL transmission and offer it at wholesale, but could continuing to do so via commercial agreements if they chose. AT&T began deploying their U-verse platform based on newer and faster DSL variants than the legacy DSL platform, and they began offering faster Internet access speeds as well as TV service to their retail customers. Initially AT&T didn't wholesale U-verse at all; today they wholesale the platform but only with AT&T Internet access bundled into it, not as a layer 2 transmission service like legacy DSL that ISPs could differentiate themselves on top of by using it to deliver the independent ISP's own upstream Internet access, distinct from AT&T Internet's upstream Internet service. U-verse has never been offered as a pure transmission product, just bundled with AT&T Internet access. AT&T's wholesale of U-verse is essentially a resale of the Internet access component of their retail offering. AT&T didn't kick independent ISPs off the legacy DSL platform despite the Broadband Order, but did not develop it any further, so we were left with the existing speed plans, coverage areas, and the requirement for the end customer to also maintain a POTS landline service active with AT&T[3].

After the Broadband Order, my business had to evolve somehow to continue, as legacy DSL was becoming less and less relevant and competitive. So in 2008, I decided to establish a CLEC to deploy our own DSL and Ethernet over Copper (EoC) equipment. Our new subsidiary was quickly granted a CPCN by the California PUC, but, frankly, due to being a bit intimidated by the process of

[2] For simplicity, I'll refer to this wholesale service as AT&T's, ignoring as not particularly relevant for the instant proceeding the various mergers and name changes, and SBC's Advanced Solutions, Inc. subsidiary offering this wholesale product over time.

[3] In the merger proceeding where SBC acquired AT&T in 2005, the company made a commitment to drop the underlying landline voice requirement for two years, but only did so at retail, never for wholesale DSL products despite there being no language in the commitment that exempted it. They made a similar commitment in the AT&T/Bellsouth merger about a year later, with slightly different wording likely to give them a plausible argument that they could exclude wholesale DSL without overtly stating so, and again did not offer standalone legacy DSL transmission at wholesale without an underlying retail AT&T POTS line subscribed to carry it.

actually ordering and installing collocation and worried I'd make rather expensive mistakes (I did), it wasn't until early 2011 that I finally started to get collocations online, initially a batch of six central offices. Currently we are collocated in 18 AT&T central offices around the San Francisco Bay, the result of considerable investment that we are still earning back. As CLECs go, Raw Bandwidth is small; I perform all day-to-day operations myself with no other employees, from sales and billing customers; selecting, contracting with, and paying vendors; installing and configuring all manner of DSL, EoC, and networking equipment end to end; and installing customer's service, diagnosing trouble and fixing inside wiring and other problems not the responsibility of AT&T.

Raw Bandwidth primarily makes use of 2-wire loop UNEs to connect its DSL and Ethernet-over-Copper (EoC) equipment to customer premises, and dark fiber unbundled dedicated transport (UDT).

I present these comments from the perspective of a CLEC operating in AT&T's ILEC territory in Northern California. To the extent my comments are contradicted by the experiences of CLECs in other parts of the country and their dealings with their relevant ILECs, it is evidence that national forbearance is inappropriate. For the reasons below, I urge denial of the Petition.

Don't Lose Sight of the Natural Monopoly

The Commission is well aware of the concept of a "natural monopoly", and I ask that it not lose sight of the concept and the importance of acknowledging it in policy decisions for purposes of promoting competition.

Utilities of many types, of course, are the classic examples of natural monopolies, with the substantial infrastructure costs and the societal disruption involved in unnecessarily and economically inefficiently duplicating much of utilities' infrastructure to offer two or more direct competitors. The traditional approach to natural monopoly utilities in the United States is to allow them to exist as a monopoly, but to regulate them aggressively. But even in traditional natural monopoly utilities, not all aspects of their operation are necessarily natural monopolies. If legislators and regulators find the right way to define the traditional operational elements of the

legacy utilities that aren't natural monopoly elements, viable competition can be promoted while narrowly defining and regulating the natural monopoly components of the business.

As an example, over the past 25 years or so, the electricity market has been deregulating to a large extent, but legislators and regulators still acknowledges and respect the natural monopoly elements of it. In California's investor owned utility electric service areas, in any given area there remains a single, heavily regulated, electrical distribution system, but generation and retail electrical sales have been made more competitive because, while expensive, competition is viable and can occur in an economically efficient manner for those major components. But we don't make retail electric suppliers deploy a whole second set of distribution plant to compete in a given area, we respect that natural monopoly and allow them regulated access to distribute their product of electrons over the existing natural monopoly plant. The public would not accept duplicating electrical distribution even if it were economically viable and efficient for a competitor to overbuild the incumbent's electrical distribution plant--it'd be too disruptive with construction, and too unsightly to the extent additional and duplicative overhead facilities would be needed.

The Telecom Act of 1996, and this Commissions' Computer Inquiry decisions before it, have embedded in them rules which substantially acknowledge the reality of natural monopolies in Telecom even when not calling them out as such specifically. As it relates to DSL, Computer Inquiries required the unbundling of layer 2 access if the ILECs wanted to use DSL to implement their own retail products--the were required to offer wholesale DSL basic transmission in order for subscribers to connect between an end user's premise and the ISP of their choosing. With the Broadband Order (FCC 05-150) issued in 2005, the Commission in some sense effectively decided that this basic transmission service was more than the barest bones of the natural monopoly component of the service, so ILECs no longer need to offer it. Some of us disagree with the wisdom of that decision.

So all along, unbundled network elements, or UNEs, were available to CLECs pursuant to §251(c)(3) of the act, and some of those like Covad, Northpoint, and Rhythms used the 2-wire loop UNEs to implement their own wholesale DSL services and offered the built up DSL services to retail ISPs. The 2-wire loop UNE is about as bare bones as you can get--the wire pair between an ILEC Central Office ("CO") and a customer's premise. To duplicate the 2-wire copper loop plan to

connect to each premise would be a massive expense, impractical and economically inefficient, and classically a natural monopoly. But what if the loop to the premise is a fiber strand or two, instead of a copper wire pair? Fundamentally it's no different from a natural monopoly perspective--that plant as well is one. Nevertheless, in early 2005 the FCC release the Trienniel Review Remand Order ("TRRO", FCC 04-290, 20 FCC Rcd 2533) and the Commission decided to no longer require that ILECs offer an unbundled dark fiber loop UNE, in an effort essentially to encourage more ILEC fiber deployment, knowing that they wouldn't have to share it. At the time, fiber to the home or even to most business buildings was not ubiquitous like the copper loop already was.

When each natural monopoly facility services just one provider and must be duplicated in some form to allow a competitor to reach each end user's premises in order to provide services such as Internet access that are just above basic transmission, an end user is unlikely to have as many distinct competitive options for Internet access as we saw providing service over the legacy DSL layer 2 (basic transmission) wholesale platform. There is a reasonable argument that because the wholesale legacy DSL platforms resulted in a common set of speed plans, it didn't allow for as much differentiation in service offerings as a more diverse set of competitors operating at a lower level in the network would provide, but it clearly enhanced competition. The 2-wire UNE loop is the barest of network elements, and allows for further diversity of service offerings, to the limits of DSL and EoC technology. The fiber loop UNE, if still available, would have allowed for that type of differentiation as well[4].

UNE Loop Unbundling Creates an Incentive for ILECs to Deploy Fiber

[4] From a practical standpoint, fiber is the clear winner for wireline. Broadband over Powerline is unlikely to be revived. Existing hybrid fiber coax cable networks are likely headed to migrate to fiber to the home over a longer period of time, and while PON with optical splitters is the architecture today to reduce the fiber count leaving the central office, and we're likely to see the basic PON architecture for a long time even as speeds and capacities increase, home-run fiber without PON splitters could someday make sense. Even in PON architectures, it's possible and reasonable to design fiber plant in a manner that allows for sharing where individual CLECs light F1 strands in shared F1 cables, with adjustments to select providers for individual end users made at splitter cabinets. The PON plant design I see being deployed locally is suitably designed.

Petitioner asks the Commission to close the last major natural monopoly facility open to competitors prematurely. Instead, the Commission should stick with the enticement it has already given, and make the ILECs deploy fiber or other next generation facilities in order to achieve copper retirement. Requiring ILECs to deploy fiber in order to claim copper retirement in a given area has the inherent advantage in that it doesn't require any assumptions that an increase in next generation technology deployment might flow from forbearance. The public benefit goal will already have been achieved before ongoing access is removed from competitors. UNE loop unbundling relief by way of copper retirement is geographically market-specific in a self-implementing way and an elegantly simple policy to maintain.

Ethernet over Copper and the Ethernet Market as a Whole

Throughout the Petition, Petitioner speaks of Ethernet-over-Copper (EoC) as if it is a legacy service and that next-generation Ethernet service, presumably over fiber, inherently supplants EoC. Petitioner ignores the fact that they compete in a portion of the same market. While fiber has a maximum speed-*capability* advantage, the reality is that EoC is a suitable direct competitor *within* a significant portion of the Ethernet market, particularly at moderate speeds up to a few hundred Mbps, which can be achieved using EoC to within a few thousand feet of the serving central office (CO) on relatively short loops. Speeds to 100Mbps symmetric can be achieved to as far as roughly 9Kft wire distance from the serving CO, given a sufficient pair count. End-user business customers typically evaluate EoC vs. fiber-based Ethernet service by looking at the combination of speed, cost, lead time to install, the company they would be dealing with for support issues, and other features of service--the same factors typically used to evaluate any choice of network products--rather than necessarily the fact that one is implemented over copper and another over fiber. Petitioner's apparent assumption is that fiber-based Ethernet is always better than EoC; if that's the case, then as soon as fiber-based Ethernet is available to a given location, ILECs should have no trouble taking existing EoC customers by just deploying their service and offering it to these customers. The Study included as Appendix B of the Petition claims that next generation (fiber) Ethernet results in lower costs to the end-user (Study p. 16 Figure 8, and p. 17 Figure 9) and since it's supposedly as good or better in every way they should have no trouble wining all the business when offered at a lower price. But that's not what the market has decided. We sell new EoC business even in buildings that already have ILEC next generation (fiber) Ethernet service available, often competing even on price,

because EoC competes well with fiber where EoC can deliver capacity to meet the end-customer's needs.

Petitioner claims "The overriding reality of BDS marketplace is that Ethernet services are rapidly replacing legacy TDM services." (Petition p.12) which is a reasonable observation. But it also claims "Because of Ethernet's inherent superiority, Ethernet is rapidly supplanting the TDM technologies used for UNEs." (Petition p.12), suggesting that the "2-wire loop" is somehow a "TDM technology" used "for" the 2-wire UNEs, but that's a false equivalence. 2-wire loops are a medium that can be used to implement TDM access technologies like T-1, as well as packet switching access arrangements like Ethernet over Copper (EoC) links, and DSL.

The Petition then goes on to cite statistics about Ethernet business service revenue growth, and the Commission's acknowledgement of the eventual termination of TDM services altogether (top of p.13, quoting the BDS Order). The Petition dismisses UNEs as unnecessary for competition (p. 15) by citing the gradual decline of the total UNE count purchased since 2011, but doesn't acknowledge that grant of the petition as requested would immediately remove EoC competitors in the market for Ethernets service for end users for any new service because no new UNE requests would be allowed upon grant of forbearance, and likely shut down existing competitive EoC circuits provided by CLECs (but not ILECs) by February 4, 2021. The BDS Order excluded UNE-based products from its competitive option availability analysis because UNEs are subject to rules that could change and wouldn't necessarily be around forever, but the marketplace statistics cited by Petitioner including market revenue numbers include EoC revenue as part of the Ethernet marketplace.

CLECs use UNEs to Service Mass Market (Residential) Consumers Both Directly and Indirectly (Contrary to Petitioner's Claims)

Petitioner claims that "To the extent CLECs serve residential customers using ILEC facilities, they do so on commercial platforms." (Petition p.28) This is plainly false. My own

company uses 2-wire UNEs to create DSL links and service extensively. In terms of service count[5], more than 75% of our end user connections using UNEs are to individual residential subscribers. Additionally, we use UNEs to create EoC links to backhaul two special projects (I'll describe below) to service additional end user residential customers indirectly. And we use 2-wire UNE loops to provide a redundant connection for a residential building we service with a primary connection via an enterprise fiber link we rent from another carrier who constructs their own fiber.

While Raw Bandwidth's own subscriber count is small due to our overall small size, one of our major area CLEC competitors, Sonic, who the Commission is sure to hear from and about in this proceeding, serves tens of thousands of residential end user customers via UNEs for their Fusion DSL and Fusion X2 bonded DSL offerings. Undoubtedly there are other CLECs throughout the country using UNEs to service residential customers, and hopefully we'll hear from them too. Petitioner's claim was absolute and direct, and clearly false--many mass market residential consumers receive service via CLECs using UNEs.

Personally I have evaluated[6] AT&T's commercial wholesale offering to serve residential subscribers--the resale of AT&T's own Internet access offering--and rejected it because I don't want to just resell an AT&T offering[7] without being able to enhance the customer's experience with regard

[5] I have not analyzed the distribution of individual UNEs. Many business connections bond multiple 2-wire UNEs, as many as 48 into a single service, so as a percentage of individual UNEs in use, the percentage split will shift towards business service.

[6] I did so about two years ago--not in response to this petition--while considering the status of AT&T's legacy DSL platform and particularly looking for a path to continue supporting the customers we have remaining on that platform.

[7] AT&T's almost-defunct legacy DSL offering is a basic transmission service used to connect the end user's home or business to the ISPs own network. Individual ISPs deliver their own Internet service on top of it and can differentiate to a decent extent their services. For example Sonic and ourselves both offered pure bridged and routed access using the platform, while AT&T's retail offering required the use of PPPoE. We and dozens of other ISP options that were available just in our service area on the platform in legacy DSL's heyday offering their own distinct Internet access on top with different IP routing, upstream access providers and peering. There were more than 50 ISPs using the platform within California, but each not necessarily available everywhere in the state; an ISP typically connected to AT&T with an ATM backhaul connection (or if large enough, multiple) in each LATA it wanted to serve and gained coverage where wholesale DSL was available for that LATA. With respect to net neutrality, the high level of competition even at this level, with each ISP on top of an unmolested layer 2 platform like legacy DSL, would have naturally helped keep net neutrality issues in check without special rules since end users could vote with their feet and switch to an ISP that provides an unmolested connection to the Internet. Both Raw Bandwidth and Sonic also offered products that leveraged multiple legacy DSL circuits to create a single, faster connection, combining up to four lines for four times the speed of a single circuit (similar to DSL bonding but implemented at a higher network layer), something which AT&T didn't offer to its Internet access customers. This, unlike merely reselling AT&T's own residential Internet access product, is

to the basic connection. I'm aware that Sonic has chosen to resell U-verse in certain geographic areas, particularly further from the serving AT&T central office where a remote terminal is needed to reach a customer with decent DSL speeds in order to fill out its coverage, but it's likely they too would prefer a layer 2 wholesale transmission product they could put their own Internet service on top rather than reselling AT&T's Internet access in this circumstance.

Raw Bandwidth also uses 2-wire UNEs to enhance service speeds available to residential customers at two special projects in San Bruno, California. For several years we have operated on-site DSL equipment--essentially a remote terminal--with multiple parallel Ethernet over Copper backhaul links to connect the two largest condo complexes in San Bruno to the rest of our network. At both developments we are able to offer service to 20Mbps, while AT&T and other DSL providers are limited to 3-5Mbps at one, and typically 3Mbps or less at the other due to the relatively long wire distances to the serving central office (with 2-pair bonding able to double those speeds, but AT&T doesn't use DSL bonding from their CO-based DSL equipment for mass market products in the Bay Area). Our limit of 20Mbps is a function of limitations in our current backhaul, not the on-site DSL equipment.

At both developments, the local municipally-owned cable company has replaced their HFC plant with FTTH in the time since we deployed to these properties and now offers plans up to 1Gbps. Even before the cable company did their upgrades, I had been looking for viable options to increase our backhaul speeds to these developments and increase the speeds we can offer to end users, and am hopeful to solve that problem soon, likely using carrier-grade fixed wireless[8]. Once our backhaul is improved, we can quickly increase speeds further using the existing DSL equipment and will deploy FTTH and G.Fast at the properties to further increase speeds. But it takes time. In the meantime, using Ethernet over Copper created with UNEs in this way has allowed us to offer

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worthwhile competition even if in an ideal world where natural monopolies didn't exist, every element of the service would be distinct.

[8] Terrain and actually reaching to the rest of our network with it is the main challenge for building fixed-wireless from these developments' locations. I also investigated reaching the developments using fiber from another CLEC that has existing fiber within 600ft and 900ft of the two properties and constructing the last mile from a mid-street meet, but it wouldn't work financially, even though I know I can gain substantial customers at the properties upon completion. To the extent the Commission presumes viable competition when a competitive alternative has fiber or other facilities within a certain distance, it is often based on unrealistic assumptions.

meaningful speed improvements to residents of these properties, available to over 2,000 total living units (with approximately 250 subscribers[9] active, and no paid advertising, just word of mouth, Yelp, and occasional mentions in HOA newsletters and office handouts).

At another large multi-tenant residential building in downtown San Francisco, we are contracted to provide service to every resident unit of the building paid at a bulk rate by the building's HOA and have serviced the building for over a decade. For the primary link, we use a lit service over fiber to the building operated by another CLEC to connect back to a third-party data center where we pick up Internet access. As redundancy to the fiber link, we maintain about 500Mbps of symmetric capacity across two parallel Ethernet over Copper links to our AT&T collocation at the building's serving AT&T central office. Last year, we experienced equipment failure on the fiber link to the building lasting for many hours, and residents were largely unaware thanks to the redundancy implemented with 2-wire UNEs.

While Raw Bandwidth, due to its small size, will be unable to deploy its own FTTH network to single family homes, I am more than willing to invest capital and use whatever technologies make sense to make it work when attainable opportunities like these condo developments arise, and UNEs remain a useful bridge to build up customer base, as well as to provide alternate paths and redundancy even once a faster primary link is established.

AT&T Continues to use 2-wire Loops for its Own Internet Access Service Products and is Unlikely to Offer an Equivalent Commercial Offering

Back around 2005, when Verizon and AT&T began developing their new mass-market/residential broadband platforms, Verizon chose FTTH with FIOS, and AT&T decided to use newer flavors of DSL for U-verse to attain faster speeds than the legacy network along with a more dense network of fiber-fed remote terminals placing DSL equipment in more streetside cabinets closer to subscribers to also help DSL attain more speed (shorter copper loops) without constructing

[9] Subscribers served by our on-site equipment at these projects are not in the subscriber counts on our Form 477 because they are not tracked the same way as individual DSL subscribers from CO-based equipment, a problem that I will rectify with the coming filing. Our past Form 477 availability data also properly reflects 20Mbps for one development, but incorrectly lists 6Mbps for the other development, the max speed available using bonded DSL prior to deploying the on-site equipment; this will also be corrected in the next filing.

fiber all the way to homes. In the past couple of years, I have observed AT&T in the San Francisco Bay Area go on somewhat of a blitz of deploying FTTH and overbuilding areas regardless of whether they have U-verse remote terminals or only had their slower CO-based IP-DSLAM service. So far it seems that AT&T has focused on the relatively easier upgrades--residential areas with overhead wiring on poles--and not pushed hard into the areas where wiring is underground. If the requested forbearance were granted, the Commission would be taking away the ability of CLECs like Raw Bandwidth to offer 2-wire based DSL and Bonded DSL to residential subscribers, even as AT&T continues to use these 2-wire loops to service both its existing[10] and new subscribers in areas where they have not overbuilt with FTTH.

In AT&T's Ex-Parte letter dated July 23, 2018 disclosing a July 20, 2018 meeting with WCB staff, AT&T states "AT&T explained that its CLEC affiliates do not use UNEs for residential services." However this is misleading for purposes of this petition. AT&T or its affiliates continue to use a network element technically identical to the 2-wire loop UNE (or sub-loops in the case of remote terminals, which is fundamentally just a difference of xLEC-side endpoint location for a 2-wire copper loop), as I described above, to service any of their residential customers on the U-verse DSL network. Who cares what it's called or how its sold between affiliates or recorded on its books if it's the same exact thing technically. They should continue to offer it to CLECs as a UNE while they are using it themselves.

At present, there is no commercial offering offered by AT&T equivalent to the 2-wire UNE, nor a tariffed offering by AT&T in California. I want to make clear-- any suggestion by AT&T that reselling AT&T's own completed Internet access product is a commercial offering that substitutes for a 2-wire UNE is nonsense. If AT&T's retail Internet access product were subject to 251(c)(4) resale, it'd be a fair to compare a commercial basis resale of it vs. a 251(c)(4) basis resale. But the 2-wire UNE is different, as it allows the CLEC to differentiate themselves more by using any suitable flavor of DSL, use bonding, control the profiling of the DSL link(s), and deliver their own Internet

[10] Even in areas where AT&T has overbuilt FTTH, they don't seem to have force-migrated existing customers off of their U-verse DSL equipment, but I believe they do insist on using FTTH for any new installs of their own where FTTH is available. Rightfully, they have not blocked us from gaining new subscribers using the existing copper even in areas where they have FTTH available; we have even had one customer switch to AT&T's FTTH and switch back to our DSL offering at relatively modest speeds just a few months later.

access bandwidth, not just resell AT&T's own completed service; the copper loop is an element, not the entire service.

AT&T is unlikely to create a commercial offering truly equivalent to the 2-wire UNE, and if they did, they would simply use it as a means to substantially raise costs on CLECs, likely to the point of driving many CLECs out of business. The proper path to ILECs removing the 2-wire loop as a UNE is copper retirement, the carrot that the Commission has already given them to complete ubiquitous fiber deployment. The ILECs presumably don't want to make a business of wholesaling 2-wire loops on commercial agreements if they are to be believed they want to ultimately be unburdened with having to maintain copper plant. So hold them to the existing rules--achieve copper retirement by deploying fiber or other next-generation networks--and leave CLECs alone in the meantime by denying forbearance. There is no competitive wholesale market for 2-wire loops. It was always a natural monopoly, and obviously no one would overbuild a parallel 2-wire copper plant to create a competitor. More broadly, there is no competitive market for any kind of wholesale narrowband nor broadband basic transmission service to residential locations broad enough to serve as a basis for national forbearance (not withstanding a few areas of the country with typically municipally owned or fostered open access networks).

In the Qwest Phoenix Order[11] at ¶34, the Commission acknowledged that in circumstances like these, that the ILECs are unlikely to make attractive wholesale offers for equivalent loop replacements. The Commission acknowledged both that experience has not shown that to occur, specifically in the FCC's previous order granting for forbearance to Qwest in the Omaha MSA[12], and that the notion that ILECs would make attractive offers is not supported by economic theory.

As an operator of a small CLEC and ISP, and having dealt with AT&T/Pacific Bell for more than 20 years, I am certain that the company would not offer Raw Bandwidth a reasonable commercial deal for 2-wire loops on a wholesale basis especially due to its small size, but I am also confident they would bully even the largest of CLECs that remain. I would not have begun a CLEC if it weren't for the statutory protections that Petitioner is now asking for relief from.

[11] 25 FCC Rcd 8622, FCC 10-113

[12] Petition of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Omaha Metropolitan Statistical Area, Memorandum Opinion and Order, 20 FCC Red 19415 (2005).

Dark Fiber Interoffice Transport Enables CLECs to Compete in Communities They Otherwise Couldn't Reach or Justify Expanding Into

The dark fiber transport UNE allows CLECs to connect their collocations in one ILEC central office to another ILEC central office using existing spare[13] ILEC dark fiber strands between ILEC central offices. In the TRRO, the Commission already added restrictions on dark fiber transport availability through the CO tiering rules published at 47 CFR 51.319(d)(3) and restriction on dark fiber transport availability at 47 CFR 51.319(d)(2)(iv). In particular, the dark fiber transport UNE is only available where an ILEC central office on at least one end of the route is a Tier 3 central office, deemed the least competitive. To be considered Tier 3, the central office must service less than 24,000 business lines, and importantly, have no more than two fiber-based collocators. A fiber-based collocator is a collocator in the CO who owns or controls dark fiber which it lights itself (not counting dark fiber transport from the ILEC) connecting from their collocation to outside of the CO, or using fixed wireless for the same purpose. The theory behind this rule is that it'd be a proxy for competitive backhaul options--a central office that falls into Tier 2 by having at least 24,000 business lines served from it, or at least 3 fiber-based collocators present in it[14], would be presumed, whether truly the case or not, to mean there is a viable market for a CLEC to purchase backhaul out of the CO from a seller other-than-the-ILEC or ILEC's affiliates. If three or more fiber-based collocators were present, the theory was they'd compete to sell other CLECs that backhaul. If more than 24,000 business lines were served, the theory is that would be enough to entice new fiber-based collocators to enter and become a competitive option for other CLECs shopping for backhaul.

Of Raw Bandwidth's 18 central office collocations, nine of them are in unbundled transport Tier 3 central offices. The availability of the dark fiber transport UNE to connect these nine central offices is fundamental to making them viable for us to collocate in them and remain a competitor offering service to end user locations served from those COs. At least for the set of Tier 3 central offices we're collocated in, the rules resulted in a correct result under the premise of the rule's metrics by placing them into Tier 3--we have no real viable options for suitable backhaul service

[13] Under the rules, the ILEC is not required to construct any fiber in order to satisfy a CLEC request, only make spare strands available to rent.
[14] Or Tier 1 by meeting a 38,000 business line or four fiber-based collocator threshold on these metrics.

from these COs--and a relative dearth of end user sales we're able to achieve within the COs reflected by the business line count metric in the tiering rules means we must keep costs as low as possible. If dark fiber unbundled dedicated transport UNE availability were removed, we'd very likely have to exit every one of these COs as there are no cost-effective transport options offered by AT&T on a commercial basis nor pursuant to tariff, stranding our investment (and insult to injury, incurring substantial additional costs under the space discontinuance procedures in our interconnect agreement (ICA) and likely any other ICA with AT&T in California). I'll note that the last two central offices we deployed into just last year are both unbundled transport Tier 3 COs; we haven't had any real chance to earn those deployment costs back.

Another point I'll make about the dark fiber transport UNE is that if forbearance is granted, AT&T is unlikely to offer any truly equivalent wholesale product, but instead only offer lit services at various capacities. I have approached my own AT&T sales rep about purchasing a dark fiber loop on a commercial agreement to one of the two condo developments where we've deployed on-site DSL equipment that I mentioned above in the section discussing our use of UNEs to service residential customers. AT&T has fiber to the main phone room already in place, constructed to service a vendor which abandoned the property several years ago, and at this point I don't think there is any active service utilizing it, it sits there idle. Prior to the Commission's TRRO, I'd have been able to rent spare strands on this cable back to our CO collocation as a UNE--we'd be offering service to end users at hundreds of Mbps using G.Fast there already--availability to almost 1300 residential units--instead of 20Mbps max--but the TRRO removed all obligations of ILECs to provide a fiber loop UNE to requesting CLECs. So I asked our AT&T account rep how much AT&T would want to lease a strand or two of dark fiber back to the CO on a commercial agreement. She didn't offer any price--she simply said they don't lease dark fiber at all[15]. In my research, I found that they at least publicly offer to lease dark fiber to government agencies, and I believe they have made some deals with other fiber-rich entities to lease or swap dark fiber, but I don't know the details of those deals. Apparently for sales to general enterprise customers and CLECs under commercial agreements, it's lit services only.

[15] After our AT&T sales rep advised they don't sell dark fiber, I inquired about lit service. She quoted one product that did not make financial sense for the project. Then she offered to quote another product ICB and submitted a request. A month in, I was contacted by a sales engineer for information about the location, which I provided. An additional month, they responded that they confirmed it's serviceable (why it took so long is beyond me; I even provided CLLI codes labeled on the facilities on site) and would get back to me with a quote. No quote ever came.

Recognizing the existing dark fiber transport tiering rules I pointed to and summarized above already limit CLECs' access to the dark fiber transport UNE to reach central offices with little to no competitive interoffice transport/backhaul options, I'll go a step further and say that if it is this Commission's desire is truly to encourage the deployment of next generation networks to more and more end user locations by more and more providers, it should consider not only maintaining the availability of dark fiber transport as a UNE, but consider modifying the existing rule in a way that encourages CLECs to invest their financial resources in constructing last-mile network to reach customers and not squander it duplicating interoffice facilities that are properly a natural monopoly. Under the present rules, if a CLEC were to construct fiber out of an ILEC CO to a customer premise, they would become a fiber-based collocator for purposes of the rule and potentially trigger movement of that particular central office from Tier 3 to Tier 2, even though the fiber they constructed doesn't actually provide a competitive backhaul option because it only goes to a customer site(s). Suddenly the CLEC doing this deployment activity has shot themselves and other CLECs operating within that CO in the foot since the rule intended to proxy for the competitiveness of backhaul options out of a CO has been triggered, removing the unbundled dedicated transport UNE as the means of backhaul from the CO[16] without actually adding a competitive backhaul option.

As it stands today, to avoid this situation, a CLEC might have to construct their own backhaul out of the CO first at potentially great expense, duplicating (at least in practical functional result if not identical route) ILEC fiber that should be considered a natural monopoly. Consider too, as mentioned, the rules only require the ILECs to make spare fiber available, which by definition will go unused for the foreseeable future if not rented to the CLEC trying to backhaul. The Commission should not only maintain dark fiber transport UNE availability, but should modify the definition of fiber-based collocator to exclude CLEC fiber that only reaches out of the CO to customer locations and does not actually serve to add to the competitive backhaul options. Doing this would allow CLECs in Tier 3 central offices to more freely invest their capital to create next generation last-mile network facilities to reach customer locations in the most rural and least

[16] Other than situations where the other end of the route also happened to be Tier 3 and can serve to maintain the route's availability, but since the typical use of the dark fiber transport UNE is to connect the Tier 3 CO to a CO in a higher tier where the CLEC was able to find and make use of suitable competitive backhaul options to connect to a third-party data center or CLEC's own facility, often this would not be the case.

competitive central offices and not be forced to squander their resources duplicating spare ILEC facilities, an economic inefficiency to be avoided, as recognized by the natural monopoly principles.

The dark fiber transport UNE is fundamental to allowing CLECS to be viable competitors in Tier 3 central offices. The CO tiering rules and limits on the dark fiber transport UNE availability factor in competitive option metrics limiting it's availability where it is truly needed, and it is limited to otherwise spare strands. Forbearance should be denied and the dark fiber transport UNE should remain available.

Several Problems Identified with the The Petition's Economic Analysis

While I am not privy to the confidential data presented in this proceeding, some of the economic analysis presented in the Petition has some identified errors that I'll explain in the next few sections. I'll refer to Appendix B of the Petition, Hal Singer et. al. *Assessing the Impact of Forbearance from 251(c)(3) on Consumers, Capital Investments, and Jobs* (May 2018) as the "Study".

Overstated Implied Gross Margin and Other Gross Margin Comparison Concerns

The Study page 16 contains a table as Figure 8 *End-Customer Retail Pricing for UNE-Based Legacy Products*. For purposes of this discussion, the Service Provider Retail Price column in this table contacts generally reasonable pricing estimates. The last column of the table is "Implied Gross Margin for Asset-Light SPs" and due to a significant error in the Cost of Service used in the calculation, it overstates the Implied Gross Margin significantly in every case.

The Gross Margin is the company's margin on the sale of its services over the cost of producing the service to sell, or cost of service (COS), but excluding the cost of SG&A--no general business overhead is included in COS, no sales person's salaries or commissions, no costs to render and collect the bill for the service. But the cost of service used in the calculation must include all cost elements incurred to provide the service itself, and this table clearly does not because the only cost the Study includes in the service's COS is the UNE element(s) used within the service (at the

prices listed in Figure 7 on the preceding page, Study page 15), completely ignoring other elements necessary to create the service sold to customers.

For example for the POTS voice line legacy retail product, they use a retail price of $34, and a UNE price of $11 which is for a 2-wire DS0 analog loop. The calculation they provide the result for in the table is RetailPrice - COS / RetailPrice, or in this case, they claim, $34 - $11 / $34 = 67.6%[17] The problem is the $11 cost of just the UNE loop clearly does not capture the total cost to implement the service. The CLEC has to provide switching, and voice transport, and personnel to install, operate, and maintain the service. A 2-wire UNE loop is just a pair of wires between the central office and the customer premise. There can be debate at the edges about what to include in COS for a carrier's Gross Margin calculation, but solely the UNE component, which is not equivalent to the completed product, clearly doesn't include all costs that should be included in COS used in the calculation.

The Study does the same thing with the Ethernet over Copper (10Mbps) entry. They use a retail cost of $400, and a COS of only the UNEs, quantity 5 x DS0 Digital loops at $11/ea or $55 total. $400 - $55 / $400 = 86.25% Again, the COS for this retail service to be used in a Gross Margin calculation is necessarily much higher--the Study again ignores the cost of transport out of the CO, the cost of upstream Internet access, and a share of the cost of the pay for technical personnel to install, operate, and support the service. I could not tell you exactly what the entire COS would total, and it will vary for different CLECs and circumstances, but it is more than $55, and that necessarily results in a lower Implied Gross Margin.

For every other entry in this table, the Study omits all COS other than the UNE, treating the component UNE as if it were equivalent to the retail service even though the UNE is but one element of the complete service, one of several costs that need to be added to determine COS[18], thus

[17] Somehow they round this to 69% instead of 68%; I speculate they may have rounded the input values to even dollars from earlier drafts without noticing that moved the resulting percentage slightly.

[18] XO, in their 2010 10K, describes their COS as: "Cost of service includes expenses directly associated with providing telecommunications services to customers, including, among other items, the cost of connecting customers to the Company's networks via leased facilities, the costs of leasing components of its network facilities and costs paid to third-party providers for interconnect access and transport services. The Company accrues for the expected costs of services received from third-party telecommunications providers during the period the services are rendered. Cost of service also includes network operations, repairs and maintenance, costs necessary to maintain rights-of-way and building access as well as certain other operational department costs. All such costs are expensed as incurred. The Company accrues costs

overstating the Implied Gross Margin. There doesn't appear to be a reason to compute a Gross Margin for this study other than to suggest that CLECs are finding outsized profits from service based on UNEs compared to the ILECs profits, and this table is misleading in that effort.

The Petition also cites to one CLEC's 10K filed at the SEC covering the year 2013, CBeyond's, reporting a gross margin of 64.9%, and compares it to the three largest ILECs gross margin range of 51.8-59.1% (Petition p.12) A single CLEC's reported gross margin cannot be assumed to fairly represent the industry as each has a different product mix and company characteristics that doesn't necessarily mirror the ILECs (and also note in that same 10K, CBeyond reported an operating loss while the three ILECs during all made money that year). The Study fails to trace any differences in Gross Margin to the underlying costs of UNEs if the erroneous Gross Margin calculations per-product in Figure 8 was an attempt to suggest such a relationship.

I attempted to find other CLECs' reported gross margins but because so many are not publicly held and don't file 10Ks, I didn't find as many data points as I'd like. XO's 10K covering 2010[19], the latest year they were a public company (they went private for a few years before being acquired by Verizon), is available. It does not provide a gross margin number directly, but effectively states it another way by providing cost of service as percent of revenue of 56.8% for 2010. The gross margin for XO in 2010 is 100% - 56.8% = 43.2%. Gross margin was located for "Bandwidth" (no relation to Raw Bandwidth), a now-publicly-traded CLEC. Bandwidth has been operating for a long time, but only went public in 2017. Bandwidth's reported gross margins for 2015, 2016, and 2017 were 42.5%, 44.0%, and 45.2% respectively[20]. Thus we have two counterexample to the Petition's citation to CBeyond's gross margin; CLECs whose gross margins are on the other side of the major ILECs'.

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for disputed invoices based on its historical trend of resolutions for similarly disputed items. If the Company ultimately settles a disputed amount which is different than the accrual, it recognizes the difference in the period in which the settlement is finalized as an adjustment to cost of service."

Of all of that, the UNEs used as the sole COS for the Study's Gross Margin of products calculation only fall into the category described by XO as "the costs of leasing components of its network facilities and costs paid to third-party providers for interconnect access and transport services", and even then the UNEs may not be the only cost that falls into that category to build up the completed service; the CLEC may be using other elements in that category from AT&T or others, in addition to incurring other costs XO describes that belong in COS to create the service.

[19] XO Holdings 10K filed March 2011 available at https://www.last10k.com/Search?q=XOHO
[20] https://financials.morningstar.com/ratios/r.html?t=BAND, retrieved 8/5/2018

The Petition apparently seeks to compare the gross margin of CLECs to the gross margins of ILECs to suggest that CLECs are riding on the backs of ILECs unfairly and reaping large rewards. Using Gross Margin in this manner is inappropriate. The comparison fails to account for differences in product mix and the companies' businesses, and in any event the gross margin from a single CLEC is not representative of the industry, nor can any differences be assumed to flow from the availability of UNEs to CLEC, and especially is not shown by using a misleading Implied Gross Margin table for generic services calculated without even attempting to include all costs of service in the calculation. I provided gross margins from publicly available reports for a couple of other CLECs only as counter-examples, not to draw any general conclusions about CLECs' gross margins.

Study's Use of Data is Questionable--Garbage In, Garbage Out

At Study p. 32, the authors state without explanation of how they derived the numbers that "the average connection speed for Next-generation services is approximately 8.84Mbps, while the average connection speed for legacy services is approximately 7.17Mps." I was not able to find any explanation about the methodology of how these were derived, and on its face they seem likely to be an improper summary of some of the purchased UNEs dataset the authors obtained from the ILECs. I can only assume they are averaging speeds of some product mix in their data set and migration presumptions. How are the authors establishing what speeds their UNE data set actually implement? For DS1 and DS3 it's well defined, but digital DS0 2-wire loops they have no way of knowing... a single loop could be 384Kbps DSL or even 50Mbps VDSL2. In their data set, they just know that it is one UNE loop. And how are they deciding what mix of speeds in there questionable starting set of services the service will migration to? Their Figure 9 table at Study p. 17 lists T-1 services next generation offering as Ethernet 3Mbps for $219, or Cable at 10Mbps. Ethernet is available at most any speed desired, including a one for one transition from T-1 at 1.5Mbps to Ethernet at the same speed. But are the study's authors assuming that each end user switching from T-1 will always double their speed or some other multiple? Are they assuming that every five DS0 digital 2-wire loops is used for one 10Mbps Ethernet-over-Copper service? And doing that even though they have no basis to know the mix of speeds the purchase DS0 digital UNE loops are actually being used to deliver or even capable of? And how are voice services worked into these averages? Did they actually count each voice channel as 64Kbps and then average those in with data service speeds?

That would be inappropriate as these are different markets[21], and the relevant metric for voice is not bandwidth per se but number of voice channels (which can be more or less than 64Kbps in a VoIP environment, depending on the codec employed). These authors appear to possibly be layering assumptions on top of assumptions.

At Study p. 31, the authors cite to a paper in footnote 72 "Usage-Based Pricing and Demand for Residential Broadband" by Nevo, Turner, and Williams (2016) ("Nevo"), where that paper's authors analyzed a set of subscriber usage data obtained from a residential ISP providing service via cable modem service. The data set necessarily was parameterized by its origin as discussed in Nevo: The data sampled came from users of a specific provider, in an area of the country with median per-capita income of $47,592 in 2011 (which Nevo notes compares roughly to the median of $45,222 for residents in all U.S. metropolitan markets.) (Nevo p.8). The provider had customers both on grandfathered plans with unlimited usage and a median download speed of 6.4Mbps, and on usage-based plans with a median download speed of 14.68Mbps. (Nevo p. 10, Table 2) Nevo does not claim this data set was a representative sample of the country as a whole, it was the data set available to Nevo's authors, and even assuming their analysis is right, is valid only for the covered market. I would expect to see differences depending on the type of industry in a given geographic area (such as tech heavy vs. farming) for example, which is not discussed in the paper. Additionally, the data used was collected from 2011 to 2012, quite a long time ago in the evolution of Internet access services.

The Study pulls just one metric from Nevo to use in the Study's own calculation, but misunderstands what the metric is and then misapplies it. In the Study the claim that the average willingness to pay ("WTP") for "every 1Mbps increase in connection speed" is $2 comes from from Nevo p.4, where Nevo wrote "We find the willingness-to-pay for a one Megabit per second (Mb/s) increase in connection speed is between $0 to $5.86 per month, with an average of $1.76." The Study appears to misunderstand the value developed in Nevo and uses it improperly even if we were to assume it applied to the data set used in the Study. A careful reading of Nevo reveals that it evaluated the marginal WTP for only a single increase of 1Mbps from the subscriber's current plan speed. Nevo does not claim that their study determined a WTP value averaging $1.76 for every

[21] Arguably many markets--residential voice, small business voice, enterprise voice, private line data, enterprise Internet access, mass market Internet access, etc

additional increase of 1Mbps, ie. not for additional increases of 1Mbps increments to the same subscriber after the first, it is only for the first 1Mbps increase from a subscriber's baseline plan speed (the specific baseline speeds in the data Nevo used, not just any random baseline).

Even if it were to be appropriate to apply to the Study's data set, and even if we were to accept that the Study's data set results in an average increase in speed across all services from 7.17Mbps to 8.84.Mbps (a difference of 1.67Mbps), applying Nevo's WTP value after already averaging away the distribution of the speed increases within the Study's data set is a misapplication of Nevo's WTP. If a particular service in the Study's data set increases from 1.5Mbps to 10Mbps in the Study's T-1 to Cable Broadband migration scenario, the $2 WTP pulled from Nevo at best applies to the first 1Mbps increase from 1.5Mbps to 2.5Mbps, not the additional speed gained from 2.5Mbps to 10Mbps. Averaging the data set first misapplies Nevo's WTP.

It is clearly not accurate to claim that "every 1Mbps increase in connection speed" has a WTP of $2 (or even $1.76) which I'll illustrate with an example.

Let's say a subscriber has a residential Internet connection at 100Mbps and pays $50/mo, a price point we've seen in the market from both Google Fiber and AT&T where AT&T has FTTH available. A full 1Gbps connection might be available from the same providers for $70-80/mo. Using the simplistic WTP claim of $2 for every additional Mbps of speed, these providers would be leaving an awful lot of money on the table--they are providing 900Mbps of additional speed for $20-30/mo marginal cost, when WTP supposedly suggests they could be charging 900 x $2 = $1800/mo additional. Would a residential subscriber pay $1950/mo for a 1 Gbps connection? The number that would (or even could) is self evidently few and far between (paging Mr. Zuckerberg). In practice there are diminishing returns-- diminishing value to the subscriber--as speed increases[22], and thus a

[22] As an example, the intrinsic value of more speed is essentially $0 for certain applications after a certain point, such as video streaming and voice over IP, where once you have sufficient bandwidth for the application there is no real benefit to further increasing it, thus an educated consumer acting in their own economic interest's willingness to pay for more speed would also be $0 at least with respect to enabling that application. Some applications should see more gradual diminishing marginal value, such as web browsing, where marginal increases in speed can help page load times improve to a point, but eventually result in an imperceptible reduction in load time as raw access speed increases because of factors other than connection speed which influence page load times (like server load, web browser software design, even the CPU power of the computer running the browser can become a bottlekneck). Bulk downloading or uploading such as online backup and restoral are the types of applications that are really able to fill fast connections with traffic for extended periods of times, and where a faster pipe can cut job completion times substantially, but even then the subscriber's WTP for a subsequent marginal increase in speed will drop as they are obviously not going to pay their

diminishing willingness to pay for a marginal increase in speed as speeds increase further and further from any baseline.

The Study calculates (without showing the calculation that I can find) that "an aggregate ten-year welfare gain from improved connection speeds is estimated at $29 million." (Study p. 32). The purported calculation is based on the earlier mysterious claim that average speeds increase from 7.17Mbps to 8.84Mbps if the Commission grants the petition, and the claim that the WTP for every increased Mbps is $2. The 7.17Mbps to 8.84Mbps, as I described above, has the smell of being based on inappropriate methodology which should be scrutinized closely, and the WTP claim of $2 for *every* marginal Mbps is a misapplication of Nevo's WTP calculation and nonsense on its face. The computation used in the Study doesn't take into account any notion of diminishing WTP for the marginal Mbps as speed increases further and further. The $29 million dollar claim does not appear to originate from any valid processing of the data used in the Study and should be discarded.

Unrealistic Assumption in the Migration Scenario

The Study at p. 20 bases their Gradual Migration scenario (the one they peg as more realistic) in part on a presumption that 40% of end-customers will migrate to next-generation services in Year 1 after a grant of forbearance. To support this presumption, they cite to statistics from migrations away from UNE-P after the Commissions' TRRO sunseted UNE-P. The fundamental problem with this presumption is that the migration away from UNE-P did not require any construction of loop facilities or other outside plant, while making available upgraded networks does require construction[23], and will necessarily take longer and result in a slower migration. In many cases, customers moving away from UNE-P were switched by their serving CLECs to be served through commercial agreements with the ILEC, such as AT&T's "Local Wholesale Complete" product, which was merely a contractual and billing change between AT&T and the wholesale CLEC customer with no actual technical migration of any sort necessary, only administrative. In other

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entire income towards their Internet connection even if their service provider is able to deliver ever increasing speeds to them to do so with a constant WTP value.

[23] To the extent Next-Generation networks are already available at a given customer's location, Petitioner's forbearance request amounts to a distortion of the marketplace by removing a competitive option--if it's available, and it's cheaper, faster, and better in every respective (the usual mantra is to pick any two because you can't have all three), then it's an epic failure of their sales ability not to be able to sell the end user on it. So loops will need to be constructed to deliver Nex-Gen service for consumers to see a real benefit.

cases customers were migrated away by the CLEC switching to UNE-L and connecting their customer to either their own switch or contracting with another service provider to provide switching services for them--the feasibility of both UNE-L scenarios were a basis for the Commission to remove switching as a UNE as it did; in a sense, the Commission decided that voice switching was not a natural monopoly, but kept UNE-L available because the loop element is a natural monopoly. While it's possible that some loop construction occurred prompted by the demise of UNE-P, that would be the outlier case.

So how would we actually get to 40% migration in the first year vs. a 6.9% rate the Study claims for a status quo scenario? If we take the Study's claims of additional investment at face value, they claim a CapEx increase of $117 to $182 million annually (Study p. 25, Figure 11) AT&T alone incurred a total CapEx of $21.6 Billion dollars in 2017[24], but doesn't break it down by segment. Verizon incurred $17.2 Billion dollars total CapEx in 2017, and $5.4 Billion of that in the wireline segment.[25] The net increase in annual CapEx the Study expects is so dwarfed by existing CapEx of just these two ILECs that it's only reasonable to conclude that the next-generation networks to capture this supposed 40% migration in the first year are largely already available or would become available through the status quo scenario CapEx spending (resulting in only a presumptive 6.9% annual migration). But the proposed transition plan allows existing UNE-based links to stay in place until early 2021, so existing users could largely continue using their existing services. There'd be some churn from end customers moving locations or from needing a speed upgrade they could no longer get using their existing UNE-based product (assuming it was technically viable prior to forbearance), which might juice the presumed 6.9% migration rate without forbearance slightly, but forbearance would not otherwise immediately push end customers to switch services to a next-generation service if they are comfortable with what they have. Thus we have to assume that much of the 40% migration would have to be attained by next-generation service providers ramping up their marketing for services that are already available because they'd not be getting all that much immediate help pushing customers towards them from forbearance. This of course is unrealistic--if they had next-gen services available, and it's compelling enough to convince

[24] https://investors.att.com/~/media/Files/A/ATT-IR/financial-reports/annual-reports/2017/complete-2017-annual-report.pdf at page 14, retrieved 8/5/2018. AT&T's report states that it does not break down CapEx by segment because, for example, wireless and wireline share use of many assets (page 18).
[25] https://www.verizon.com/about/sites/default/files/2017VerizonAnnualReport.pdf at page 30, retrieved 8/5/2018.

an end user to switch, they would win the customer's business *today*, by competing, without needing help from forbearance to kill the competition.

It should be apparent that a 40% first-year migration is unrealistic. This faulty assumption flows through and--even if we assume the Study's model and any other assumptions plugged into it are valid and realistic--results in an overstatement of the aggregate consumer savings over 10 years, and feeds back to reduce the additional CapEx since it is based on revenue flows to different classes of provider, which reduces the job creation benefits and multiplier effects because of the reduced marginal CapEx spending.

Problems with the Study's Claims About End-Customer Savings

Study p. 17 includes Figure 9 Next-Generation Replacement Products, Pricing, and End-Customer Savings which purports to calculate savings that end users will magically receive once "Next-Gen" services are available to them.

In general, the notion that and end-customer will see a retail price drop once and because of the deployment of Next-Generation services is nonsense. Retail customers costs savings will be borne out of COMPETITION. With insufficient competition, the duopolies and oligopolies keep prices higher, and they have no incentive to directly pass on their own cost savings to their retail customers.

With respect to the Legacy Retail Product of a POTS line at $34, Figure 9 asserts that VoIP service at $20 results in end-customer savings of $14, but the comparison ignores that the VoIP service they refer to doesn't include the Internet access necessary to utilize it. VoIP over-the-top is a fairly low bandwidth consuming service, so if the end-customer has broadband Internet access anyway suitable to carry the VoIP, transport may amount to little real marginal cost to the end user, but a consumer can't replace[26] a POTS line with VoIP without broadband access so if they don't have

[26] The substitution of VoIP for POTS also sacrifices one of the public safety aspects of a true POTS line important to many which is that a POTS service is line-powered and can continue to function without site power using a telephone handset that doesn't require local power, and assuming the central office stays powered via battery and generator which

broadband at the location for other reasons, the total cost for VoIP and even a slow form of broadband to carry it, will almost certainly total more than $34 and result in an increase in cost.

But my bigger problem with this table is that it presumes that Ethernet over Next-Gen facilities (fiber) magically results in lower costs to the end-user customer at a given speed. We are capable of competing at the prices listed in this table for Next-Gen Ethernet services today in most locations where Ethernet over Copper is technically viable at a given speed. The notion that putting Ethernet over Copper providers out of business is going to magically result in even one new Next-Gen provider constructing facilities to each business location, let alone enough competitors to deliver lower costs to consumers, is a fairy tail. As I explained above in the section titled "Ethernet over Copper and the Ethernet Market as a Whole", Ethernet over Copper remains a viable competitor to Ethernet delivered over fiber and treating fiber as an clear win over Ethernet over Copper today is inaccurate.

If consumers will see cost savings from next-generation networks, and ILECs will give them reduced pricing, then why do the ILECs need to ask the Commission to summarily put Ethernet over Copper providers out of business? The ILECs should deploy the service, win all the customers either because they're better at providing service and have a lower price to boot, or they can achieve copper retirement and get to shut down the copper.

The inclusion of cable modem service in this table as an alternative is also inappropriate from the perspective of this policy discussion. A major argument of this Petition is that it will free up capital to deploy more Next-generation networks, yet forbearance would do nothing directly for a cable companies' available CapEx. For the ILEC, the presumption in the model is that they will see a net revenue boost from increased wholesale rates as CLECs switch to non-UNEs, and use a higher portion of that revenue to invest as CapEx. The only way a cable company sees a higher CapEx spend (based on capital intensity per the Study) is by picking up customers and their revenue, but they can only do that where they provide service. If the cable company is already competing for a customer, they are already offering a service the Petition claims is Next-generation. If a cable

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they typically are designed to do. To keep a VoIP service operating, local backup power is needed for both any broadband termination equipment such as a modem and/or router, and any separate VoIP terminal adapter.

modem service is an option for a particular end user now, or a SLA'ed dedicated service is available from the cable provide now, but they choose not to switch to the cable company's service, perhaps the end user has a reason for not doing so, yet the Petition asks the Commission to presume to know best for the end user by taking away their choice if they have chosen to be serviced by a CLEC using a so-called legacy service even when the cable company service--which the Petitioner is sure is better for the end-customer--is already available but hasn't won their business. In any event, the Study's presumption at page 16 that "half of customers of legacy dedicated data products are using them for Internet connections that could be acceptably replaced with ``best efforts`` broadband products" is not supported by any data, as they admit ("Given the lack of knowledge of end-customer needs..." Study p.16) and designed to juice their consumer benefit calculations by inappropriately claiming a switch to a best-effort service with substantially more savings for the consumer. Put another way, since there is no real basis to assume that a cable company's service is suddenly going to become newly available to a particular customer when the cable company receives no direct CapEx boost from the requested forbearance, we should assume the cable modem service is already available to any subscribers able to switch to it. And then we have to accept that instead of paying $70 or $100/mo for a 10Mbps or 50Mbps cable broadband service, they choose to pay, today, $300 or $1300/mo for a T-1 or T-3 based service respectively, but will choose a best efforts service instead of Ethernet when effectively forced off their existing service by forbearance and fiber-based Ethernet service becomes available to them? They are more likely to choose to continue to select a dedicated service with an SLA, if it's available or becomes available at no higher cost than the service taken from them (the Study presume it will become available at lower cost that the legacy service, but a higher cost than best-effort), and only resort to cable modem service if it becomes the only remaining option.

The Study also mentioned software-defined wide area networks ("SD-WAN") (p. 16) and suggests this is a magic bullet to allow end-users to substitute best effort services for enterprise grade services (which for reference below I will shorten to SLA'ed service, that is a service with some promises about uptime, capacity, and repair response). That is not quite the whole story. SD-WAN for this purpose is largely a form of smart virtual private network (VPN). The Study suggests that it turns a best-effort service into replacement for more expensive dedicated circuits or SLA'ed Internet access services. Enterprises have been using VPN where appropriate to replace private line to connect offices over the Internet for well over a decade, but the evaluation of whether to use best-

effort service vs. an SLA'ed Internet access service like Ethernet over Copper, fiber-based Ethernet, or legacy T-1 and T-3 based Internet access are typically offered is largely a separate issue and more of a function of service level requirements (like uptime, speed guarantees, and repair response times). SD-WAN offerings may add some advanced QoS capabilities and traffic prioritization than older VPN software when operating over a single connection (useful regardless of whether the underlying access is SLA'ed or best effort), but it doesn't increase the reliability or guaranteed speed on underlying best-effort connections with only a single line. When talking about SD-WAN as a way to potentially enable the use of best-effort services as a replacement when enterprise level SLA'ed services are otherwise indicated by the end-customer's needs, the Study ignores a necessary network component to be provided to the SD-WAN--two or more Internet access services, not just replacing one higher grade SLA'ed service with a best-effort service. By using two best-effort services (or a best-effort service along with a slower SLA'ed service at less than the cost of a single faster SLA'ed service), SD-WAN can provide mitigation for the best-effort nature of the underlying service using load balancing and VPN bonding to provide failover and redunancy. If given two best-effort services and one goes down or is impaired, the SD-WAN can keep the end-user operating on the other connection, even if it must take a speed hit while doing so. The idea is to find the best combination of price and performance from two or more Internet connections and use the SD-WAN system operating on top to enhance availability to the point of being a viable substitute for an SLA'ed service (potentially even exceeding that of a single SLA'ed service though not always at lower overall costs for the circuits, and some scenarios also require an SD-WAN service provider with additional monthly cost). The Study does not factor two underlying Internet access services into its analysis when suggesting best effort can replace SLA'ed service. It should be noted that SD-WAN is not dependent on so-called next-generation networks, it works fine on DSL and Ethernet over Copper, and some companies even add cellular wireless into the SD-WAN mix to provide backup to wireline and fixed wireless links.

At Study p.30 footnote 68, the authors mention "substantial customer inertia even when unambiguously superior alternatives become available." Petitioner would like the Commission to simply accept that so-called Next-Generation services are "unambiguously superior" than legacy services. But there is no evidence that these services are "unambiguously superior"; there are factors other than speed and monthly cost that factor into a customer's decision whether to purchase a particular service. I don't doubt the existence of inertia in consumer's choices, but the proper way to

overcome it is with marketing and education of the consumer, coupled with a truly better product value, not by forcing the end user's hand by withdrawing service chosen by the consumer. As I keep repeating in various ways, if the service is so good, the ILECs should win in the marketplace. Build it and convince the end users to switch to it.

Potential Unintended Effect on Collocation Rights

There are potential unintended effects that could impact CLEC's right to collocation if blanket 251(c)(3) UNE forbearance is granted. The Petition does not appear to claim to be a request for forbearance with respect to 251(c)(6) collocation, however 251(c)(6) provides the right to physical collocation within the ILEC central office in order for a CLEC to do either or both of interconnect with the ILEC (for the exchange of voice traffic) and to access UNEs. To the extent a CLEC has collocation within the central office for the purpose of accessing UNEs, but not voice interconnection, the ILECs may contend that forbearance from 251(c)(3) obligations for all UNEs imperils that CLEC's right to be physically present within the CO.

Even to the extent that direct replacement commercial offerings are made for specific types of UNEs or they're available from tariffs, and the ILEC allows a CLEC to remain within the CO only to access those commercial replacements, it may take the position that the collocation no longer has to be provided pursuant to 251(c)(6) and with the benefits and protections it affords.

ILEC central offices have in some cases become important points in CLECs network tangential to interconnection and access to UNEs. For instance, the Commission has recognized that CLECs interconnecting with each other within the central office is allowed due to economic efficiency, that the CLECs are there and should be able to connect with each other rather than have to haul traffic out and meet elsewhere, and to provide a competitive option for backhaul instead of the ILEC[27]. By virtue of redundant backhaul connections established from the CO, for instance a combination of two or more leased circuits from a third-party carrier, dark fiber whether constructed or leased, or a fixed wireless backhaul, the CO can be a point on a path, ring, mesh, etc. where while providing redundancy for the collocated CLEC's presence in the instant CO, the loss of collocation within the CO and those links breaks redundancy for other locations. It is typically a substantial

[27] Local Competition Order, FCC 96-235, 11 FCC Rcd 15499, Co-Carrier Cross-Connect section, ¶592 et seq.

investment for a CLEC to place equipment within a central office and having to not just vacate the CO and stranding investment, the CLEC may also have to make additional investments to work around the loss of the CO as point within a path or ring providing redundancy to other sites. To the extent a CLEC vacates a central office because of the loss of UNEs, other CLECs who rely on the existing CLEC for backhaul may also be impacted by the competitor's exit.

272(e)(1) Time Interval Requirements

The Petition (at p.33) requests forbearance from section 272(e)(1)'s RBOC-specific time interval requirements, which essentially require RBOCs to provision telephone exchange service and exchange access for unaffiliated access on par with and without discriminating in favor of doing the same for itself or its own affiliates. I frankly don't know why this wouldn't be a requirement of all providers offering wholesale services, it is not unduly burdensome, and it should remain in place.

The Petition (at p. 36) points to Commission findings regarding competition in the BDS Order in order to provide relief in that proceeding suggesting the findings are also sufficient to ensure that competitive options will prevent RBOCs, in practice, from discriminating on installation intervals in favor of themselves and their affiliates. The BDS Order, however, counted as a competitive option the presence of a BDS competitor's network a half mile away, and decided this was sufficient to keep ILEC *pricing* in check, but did not purport to measure the amount of time it'd take the supposed competitive option to actually extend to the customer location once a service order is placed.

The Commission relied, in part, on data from service providers' Form 477 filings to determine where competitive providers' services are already available, and then used a 1/2 mile distance from existing availability to claim they are a competitive option outside of where service is already offered. As BDS Order footnote 320 notes, providers report service as available in a census block on Form 477 " if the provider does, or could, *within a service interval that is typical for that type of connection*" (emphasis added) provision service somewhere within that census block. The Form 477 availability data is not an assertion that the provider can install service in a typical time period to every address within a census block, only that it can do so for at least one address within

that census block; even some or many addresses within a census block reported as serviceable may not support service installation within a service interval that is typical for that type of connection, if it all. Additionally, by a census block's absence as serviceable in the Form 477 data, the provider is in effect specifically disavowing the ability to provision at least Internet access service (what is reported on Form 477) in a reasonable and customary time for the type of service to *every address* in any census block reached by the BDS Orders' 1/2 mile radius but not already reported as serviceable by the provider on Form 477. Because Form 477 doesn't capture all types of data connections, in the BDS Order the Commission also used dated from the 2015 Collection, which gathered data on other types of services. While this second set of data may show availability to certain locations not captured in Form 477, the RBOCs' ubiquitous presence within a service area is likely to leave RBOCs' services with in inherent time-to-install advantage at many locations, especially when the only competitive option must perform construction to a building the RBOC already has facilities to, so a competitive option under the BDS Order may not be a competitor to the RBOC with respect to service activation intervals.

Additionally, even the BDS Order did not result in a nationwide result like the national forbearance requested here. Where the BDS Orders' own metrics did not even find enough competitive options for the relief requested there, so too would relief from 272(e)(1) be inappropriate. National relief from this requirement is not appropriate.

For the reasons stated above, the Commissions' competition analysis in the BDS Order, and the FCC's Form 477 data, are insufficient to ensure that competition will keep an RBOC's treatment of installation time interval for the provision of wholesale BDS services for competitors in check, an especially not sufficient to justify national forbearance. Relief from the Section 272(e)(1) RBOC-specific time interval requirements should be denied.

Disruption Built In To Transition Proposal

I frankly don't like to talk about the proposed transition plan if forbearance were to be granted as I believe first and foremost that it should be denied, however to the extent forbearance

were to be granted with respect to 251(c)(3) UNEs, the Revised Transition Proposal[28] calls for termination of CLECs' ability to add and change 251(c)(3) UNEs immediately upon grant of the requested relief (ie. after Commission approval and publication), even though it would allow existing UNEs purchased by CLECs to stay active through 2/4/2021.

Such an abrupt halt to new ordering activity would cause immediate difficulties for CLECs and their customers as the CLECs' business methods and practices are upended in short order. End-customers trying to move services may not be able to continue their service even if the CLEC is able to put together alternative means to continue serving them over the course of a longer period. CLECs' already weak negotiating position would be hampered even more with the ILEC able to use the pressure of time to force deal terms in their favor. And CLECs' negotiating position even with competitive providers able to offer wholesale alternatives would also be weakened.

There is no compelling reason to justify such an abrupt halt to CLEC ordering activity and the disruption it entails. If forbearance is granted, the status quo including new/change ordering should be maintained for a significant period of time, with a second phase where existing arrangements can be maintained for a substantial additional period of time. To the extent the Commission expects forbearance to drive additional facilities deployment, the Revised Transition Proposal does not allow even a fighting chance for CLECs to ramp up or find partnering solutions to do so without serious business disruption.

Conclusion

Raw Bandwidth urges the Commission to deny the USTelecom Petition for Forbearance. Any petitions for forbearance should have been narrowly focused towards specific geographic markets and network elements; nationwide forbearance is inappropriate. The application as submitted would have far reaching and devastating negative impact on competition and consumer choice, and potentially significant unintended consequences due to its broad-brush approach. The Petition claims incorrectly that mass market/residential consumers are not serviced by UNEs.

[28] USTelecom Letter dated 6/21/2018, describing a modified transition proposal

I pointed out and explained several problems I see with the Study that Petitioner is using in its effort to claim economic benefits would flow from forbearance including faulty migration assumptions feeding their model and a misunderstanding and misuse of a data point pulled from another study to use improperly in their own. The Study's conclusions should not be trusted, nor used in policy decision making.

Raw Bandwidth uses primarily 2-wire digital loop UNEs and dark fiber transport UNEs, and especially needs them to remain available, but supports other commentators whose businesses depend more heavily on other 251(c)(3) UNEs and 251(c)(4) resale. We would like to retain the ability to make use of other UNEs and resale as well if a need arises that they can help us with, particularly as long as the underlying elements remain generally in use by the ILEC itself or its affiliates. Our "negotiating" position (I use the term loosely) with ILECs is especially weak due to our small size, but even the largest CLECs are at a severe disadvantage when negotiating with ILECs.

The Commission should deny the Petition and maintain the status quo. Instead, if it sees areas where some forbearance might be appropriate, it should open a proceeding to closely study and evaluate--with appropriate data gathering and public participation--more narrow and targeted relief.

Respectfully submitted,

/s/ Michael S. Durkin

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August 6, 2018